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| 10/572,532 | 03/17/2006 | Kibatsu Shinohara | 96790P527 | 7038 |

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| EXAMINER |
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GANNON, LEVI

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2817

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/572,532 | Applicant(s) SHINOHARA, KIBATSU | |
| | Examiner LEVI GANNON | Art Unit 2817 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-14 is/are rejected.
- 7) ☒ Claim(s) 2-4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/17/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 13 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 13 contains the following recitation “... *a heater power supply which decreases the voltage to be applied to said heater as an electric current flowing through said anode increases.*” However, the written specification and drawings do not disclose how this is done. The drawings and written specification do not teach any type of control mechanism, processor, or sensor that performs either of the following two functions: a) Determine if and/or how much the anode current increases. B) Decrease the voltage output from the heater power supply according to the determination about the increased anode current. Because the original specification does not teach any manner in which the anode current is determined nor does it teach how the anode current will affect the heater power supply voltage output, it is the Examiner’s position that the specification does not enable one of ordinary skill in the art to make and/or use the Applicant’s invention as set forth in claim 13.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Donal, Jr. (hereinafter "Donal") (US Patent 2,820,197) in view of Kline (US Patent 2,949,581).

Regarding claim 1, Donal discloses a magnetron oscillator (figure 1) characterized by comprising: a first magnetron (1); a launcher (the launcher is not labeled, but a magnetron inherently has a launcher to provide an output power) which extracts an output power of said first magnetron; and a reference signal supplier (24) which supplies, to said first magnetron (1), a reference signal lower in electric power and more stable in frequency (The oscillator 24 is used to injection lock magnetron 9. Magnetron 9 is in turn used to injection lock magnetron 1. Stable frequency and low electric power are inherent properties of oscillators used for injection locking.) than the output from said first magnetron (1).

Donal does not teach an impedance generator connected between the launcher and the reference signal generator (24); wherein the impedance generator adjusts a load impedance of said first magnetron.

Kline teaches an impedance generator connected directly to a magnetron. The phase shifter 31 of Kline adjusts impedance by adjusting a length of the cavity. The

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phase shifter of Kline is also used produce a particular operating frequency. Col. 3, line 70 to col.4 line 2.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add an impedance generator to the magnetron oscillator of Donal because such a modification would have provided the benefit of the ability to adjust the magnetron oscillator to a particular operating frequency. Note that connecting the impedance generator of Kline to the magnetron of Donal would place the impedance generator between the launcher and reference signal generator of Kline.

Claims 5-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donal in view of Kline further in view of Nyswander (US Patent 6,914,556).

As for claim 5, Donal teaches a reference signal oscillator (24) which oscillates the reference signal; and a three-way node (directly above magnetron 9 in figure 1 of Donal) which guides the reference signal from said reference signal oscillator to said impedance generator (impedance generator added to Donal would be connected between this three-way node and magnetron 1. note the impedance generator of Kline was connected directly to the magnetron.), and guides the output power of said first magnetron (1), which is supplied from said impedance generator, in a direction of a load (8).

Donal does not expressly teach the three-way node being an irreversible member.

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It is well known to those of ordinary skill in the art to use circulators that only pass signals in one direction in magnetrons. Nyswander teaches magnetron oscillator (figure 2) with a ferrite circulator (27) as an irreversible member for guiding various signals in the magnetron. Note col. 2, lines 36-38.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add a circulator to the three-way node of Donal because such a modification would provide the assurance that the signals in the magnetron of Donal were only passed in the direction in which they were intended.

As for claim 6, Donal modified by Nyswander teaches the irreversible member (27 of Nyswander added to Donal) being one of a circulator, a directional coupler, and a branching/coupling device. The circulator of Nyswander is also a directional coupler (passes signals in only one direction), and a branching/coupling device (couples various branches of signals).

As for claim 7, Donal teaches an amplifier (27) which amplifies the reference signal from said reference signal oscillator (24).

In terms of claim 8, Donal teaches the magnetron oscillator according to claim 7, as noted above, but fails to expressly teach the amplifier comprises a plurality of amplifiers connected in series or parallel.

However, as would have been recognized by one of ordinary skill in the art, the variable gain device 27 (that amplifies the output of oscillator 24) could be replaced by a plurality of amplifiers connected in series or parallel and provide the same function of amplifying the output signal of oscillator 24.

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Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace the variable gain device 27 of Donal with a plurality of amplifiers connected in series or parallel because such a modification would have been a replacement of art recognized functionally equivalent amplifier devices.

In terms of claim 9, Donal teaches a second magnetron (9) having an output power higher than that of said reference signal oscillator (24) and lower than that of said first magnetron (1), and supplies, to said first magnetron, an output power of said second magnetron having an oscillation frequency locked to a frequency of the reference oscillator (24) by injection of the reference signal. The oscillator 24 is used to injection lock magnetron 9. Magnetron 9 is in turn used to injection lock magnetron 1. Stable frequency and low electric power are inherent properties of oscillators used for injection locking.

As for claims 10-12, Donal teaches the magnetron oscillator according to claim 1, as noted above, but fails to teach an isolator which is connected between said reference signal supplier and a load, absorbs a reflected power from said load, and guides the output power of said first magnetron, which is supplied from said reference signal supplier, in a direction of said load; wherein the isolator comprises: a dummy load which absorbs an electric power; and a circulator which guides the reflected power from said load to said dummy load, and guides the output power of said first magnetron, which is supplied from said reference signal supplier, in a direction of said load.

Nyswander teaches an isolator (26, 27, 29) which is connected between a reference signal supplier (21) and a load (28), absorbs a reflected power from said load

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(28), and guides the output power of a first magnetron (24), which is supplied from said reference signal supplier, in a direction of said load (28); wherein the isolator comprises: a dummy load (29) which absorbs an electric power; and a circulator (27) which guides the reflected power from said load to said dummy load, and guides the output power of said first magnetron (24), which is supplied from said reference signal supplier, in a direction of said load (28). See col. 2, lines 36-48. Note that the isolator of Nyswander provides the function not allowing any unwanted feedback signals from reaching the magnetron and reference signal supplier.

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the isolator of Nyswander to the magnetron of Donal because such a modification would have provide the benefit of not allowing any unwanted feedback signals from reaching the magnetron and reference signal supplier.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Donal in view of Kline further in view of Tomoyasu et al. (hereinafter "Tomoyasu") (US Patent 6,544,380).

In terms of claim 14, Donal teaches the magnetron oscillator according to claim 1, but fails to teach the magnetron being used as a microwave power supply of a plasma processor which performs predetermined processing on an object to be processed, by using a plasma generated by a microwave.

It is well known to use magnetrons in plasma processing devices. Tomoyasu teaches an example of a magnetron plasma processor in figure 29.

It would have been obvious to one of ordinary skill in the art at the time of the invention to place the magnetron of Donal in a plasma processor because such a modification would have been making use of a well known application of magnetron oscillators.

Allowable Subject Matter

Claims 2-4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The best art of record, Donal, taken alone or in combination of other references fails to teach or fairly suggest “... *at least one of the load impedance of said first magnetron and the electric power of the reference signal supplied from said reference signal supplier changes in synchronism with the output power of said first magnetron.*”, as set forth in claim 2; or “... *a synchronous controller which controls at least one of said impedance generator and said reference signal supplier on the basis of at least one of an anode current and the output power of said first magnetron.*”, as set forth in claim 3.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 2,748,277 teaches a magnetron with a heater and

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heater power supply. US Patent 3,139,592 teaches a magnetron with a phase shifter and tuning screw that are used as an impedance adjuster.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEVI GANNON whose telephone number is (571)272-7971. The examiner can normally be reached on Monday-Friday 9:30AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG
09/04/08

/Robert Pascal/
Supervisory Patent Examiner, Art Unit 2817